

REMARKS/ARGUMENTS

Favorable consideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-23 are presently pending in this application, Claims 2 and 21-23 having been withdrawn from further consideration by the Examiner, and Claims 1 and 6 having been amended by the present amendment.

In the outstanding Office Action, Claims 1, 3-5, 9, 10 and 12 were rejected under 35 U.S.C. §103(a) as being unpatentable over Eui-Yeol (U.S. Patent 6,035,871); Claims 6, 7 and 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Eui-Yeol in view of Yeol et al. (U.S. Patent 5,983,909); Claims 15-18 were rejected under 35 U.S.C. §103(a) as being unpatentable over Eui-Yeol in view of Numano et al. (U.S. Patent 5,739,575); and Claims 8, 11, 13, 14 and 19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Eui-Yeol in view of Carter et al. (U.S. Patent 6,080,531).

Claim 1 has been amended, and accordingly Claim 6 has been amended. These claim amendments are believed to find clear support in the claims, specification, and drawings as originally filed.¹ Hence, no new matter is believed to be added thereby.

Briefly recapitulating, amended Claim 1 of the present invention is directed to a substrate treatment process for removing organic matter existing on a substrate, including treating the substrate with ozone water prepared by dissolving an ozone-containing gas in ultrapure water and hydrogen water prepared by dissolving a hydrogen-containing gas in ultrapure water in tandem, wherein the ozone water includes at least one substance selected from the group consisting of carbon dioxide, ammonium carbonate, acetic acid, and formic acid in an amount sufficient to maintain an ozone concentration of the ozone water. By

¹ For example, Specification, page 12, lines 6-19.

treating the substrate as such, fine particles adhered onto the substrate are oxidatively decomposed and removed more efficiently.²

Yeol et al. disclose a cleaning method. Nevertheless, Yeol et al. fail to teach “treating said substrate with ozone water prepared by dissolving an ozone-containing gas in ultrapure water ..., wherein said ozone water includes at least one substance selected from the group consisting of carbon dioxide, ammonium carbonate, acetic acid, and formic acid in an amount sufficient to maintain an ozone concentration of said ozone water” as recited in Claim 1 as amended. On the other hand, Yeol et al. disclose an aqueous cleaning solution prepared by mixing an acidic solution with ozone water. Yeol et al. further disclose controlling the oxidation-reduction potential and pH by changing the concentration of acidic solution with respect to ozone water.³ However, it is believed that Yeol et al. do not disclose or even suggest including “at least one substance selected from the group consisting of carbon dioxide, ammonium carbonate, acetic acid, and formic acid *in an amount sufficient to maintain an ozone concentration of said ozone water*” as recited in amended Claim 1 (emphasis added in *Italic*). Therefore, the method recited in Claim 1 is believed to be patentably distinguishable from Yeol et al.

Eui-Yeol discloses an apparatus for producing semiconductor. Nevertheless, Eui-Yeol does not teach “treating said substrate with ozone water prepared by dissolving an ozone-containing gas in ultrapure water ..., wherein said ozone water includes at least one substance selected from the group consisting of carbon dioxide, ammonium carbonate, acetic acid, and formic acid in an amount sufficient to maintain an ozone concentration of said ozone water” as recited in Claim 1 as amended. On the other hand, Eui-Yeol simply discloses the cleaning apparatus 13 including the ozonized water supply nozzle 23 for

² Id., page 12, lines 6-13.

³ Yeol et al., column 7, lines 14-18.

supplying ozonized water to the treated object 21, and the hydrogenated water supply nozzle 24 for supplying hydrogenated water to the treated object 21.⁴ Therefore, the method recited in Claim 1 is believed to be clearly distinguishable from Eui-Yeol.

Numano et al. and Carter et al. disclose an element isolation technique and an organic removal process, respectively. However, neither Numano et al. nor Carter et al. teach “treating said substrate with ozone water prepared by dissolving an ozone-containing gas in ultrapure water ..., wherein said ozone water includes at least one substance selected from the group consisting of carbon dioxide, ammonium carbonate, acetic acid, and formic acid in an amount sufficient to maintain an ozone concentration of said ozone water” as recited in Claim 1 as amended. Specifically, Numano et al. merely disclose the process of washing a semiconductor substrate, and Carter et al. simply disclose a method of removing a photoresist with a solution of ozone and bicarbonate or other suitable radical scavengers. Therefore, the method recited in Claim 1 is believed to be clearly distinguishable from Numano et al. and Carter et al.

Because none of Yeol et al., Eui-Yeol, Numano et al. and Carter et al. discloses the treating step as recited in amended Claim 1, even the combined teachings of these cited references are not believed to render the substrate treating process recited in Claim 1 obvious.

For the foregoing reasons, Claim 1 is believed to be allowable. Furthermore, since Claims 3-20 ultimately depend from Claim 1, substantially the same arguments set forth above also apply to these dependent claims. Hence, Claims 3-20 are believed to be allowable as well.

⁴ Eui-Yeol, column 3, line 57, through column 4, line 5.

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In view of the amendments and discussions presented above, Applicants respectfully submit that the present application is in condition for allowance, and an early action favorable to that effect is earnestly solicited.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

A handwritten signature in black ink, appearing to read 'Gregory J. Maier', is written over a horizontal line.

Gregory J. Maier
Attorney of Record
Registration No. 25,599

Customer Number

22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 08/03)

Akihiro Yamazaki
Registration No. 46,155

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